

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Appellants:	Shinichiro Saito et al.	)	Confirmation No.	2490
		)		
Serial No.:	10/574,762	)	Art Unit:	1797
		)		
Filed:	October 10, 2006	)	Examiner:	Palmer,
		)		Tiffany
For:	METHOD OF REMOVING	)		
	UNBURNED CARBON FROM FLY	)		
	ASH	)		

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**APPEAL BRIEF UNDER 37 C.F.R. § 41.37(a)**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir/Madam:

Appellant [hereinafter "Appellant"], in the above-captioned patent application, has appealed from the Examiner's final rejection of Claims 1-8 as set forth in the Final Office Action of February 22, 2010.

A Notice of Appeal in response to the Final Office Action was filed on April 16, 2010. This Appeal Brief is being submitted with the requisite fee under 37 C.F.R. § 41.20(b)(2) in the amount of \$270.00. If for any reason additional fees are required, the Office is authorized to charge such fees to Deposit Account Number 19-4330.

Only a single copy of the Appeal Brief is being submitted pursuant to 37 C.F.R. § 41.37(a). AN ORAL HEARING IS NOT REQUESTED.

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**I. REAL PARTY IN INTEREST**

The real parties in interest are Taiheiyo Cement Corporation, based in Tokyo, Japan, and Mitsui Engineering and Shibuilding Co., Ltd., based in Tokyo, Japan, by assignment recorded in the U.S. Patent and Trademark Office on June 2, 2006 at Reel 017712, Frame 0405.

**II. RELATED APPEALS AND INTERFERENCES**

No related appeals and/or interferences are pending.

**III. STATUS OF CLAIMS**

Claims 1-8, the only claims pending in the subject application, stand finally rejected (see Appendix entitled "CLAIMS APPENDIX").

**IV. STATUS OF AMENDMENTS**

There are no un-entered amendments.

**V. SUMMARY OF CLAIMED SUBJECT MATTER**

Of Claims 1-8 currently pending in the subject application, Claim 1 is independent in nature, with the remaining claims being either directly or indirectly dependent on Claim 1. As will be described in more detail below, independent Claim 1 of the present application relates to a method of removing unburned carbon from fly ash.

*Independent Claim 1*

Independent Claim 1 is directed to a method of removing unburned carbon from fly ash (page 4, paragraph [0018]). The method includes adding water to fly ash to produce slurry (page 4, paragraph [0018]; page 5, paragraph [0019]), to which collector is added (page 4, paragraph [0018]; Figure 3a). The slurry and collector are fed to a submerged agitator (Figure 1, 4; page 4, paragraph [0018]; page 5, paragraphs [0019]-[0020]) having a rotation shaft (Figure 2, 20d) penetrating a cylindrical main body (Figure 2, 20a) in an axial direction thereof, a plurality of chambers formed by dividing an inside of the main body

(Figure 2, 20a) in the axial direction thereof, and an agitating vane (Figure 2, 20e) fixed to the rotation shaft. The agitating vane rotates in each chamber to apply a shearing force to the slurry and the collector to modify the surface of the unburned carbon and the collector to enhance adsorption of the unburned carbon to the collector (page 4, paragraph [0018]; page 5, paragraph [0020]; Figure 3b). Frother is added to the slurry and collector to which the shearing force is added (page 4, paragraph [0018]; page 5, paragraph [0021]; Figure 1). The slurry and collector are agitated to generate air bubbles (page 4, paragraph [0018]; page 5, paragraph [0021]). The unburned carbon of the fly ash is adhered to the air bubbles to rise the unburned carbon (page 4, paragraph [0018]; page 5, paragraph [0022]; Figure 3c).

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

(A). Whether Claim 1 is improperly rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,068,131 to Styron et al. [hereinafter “STYRON”] in view of U.S. Patent No. 6,126,014 to Gray et al. [hereinafter “GRAY”].

## **VII. ARGUMENT**

### **(A) Grouping of Claims**

For the purpose of this appeal, Appellant submits that:

- (1) Dependent Claims 2-7 stand or fall with underlying independent Claim 1.

### ***Traversal of Rejection under 35 U.S.C. § 103(a)***

**(B) The rejection of Claim 1 under 35 U.S.C. § 103(a) as being unpatentable over the combination of STYRON and GRAY is in error, the rejection should be reversed, and the subject application should be remanded to the Examiner with instructions to allow Claim 1.**

### **The Examiner's Rejection of Independent Claims 1**

The Examiner submits in the Final Office Action of February 22, 2010 that STYRON teaches a method of removing unburned carbon from fly ash. More specifically, the Examiner contends that the STYRON method includes the steps of adding water to fly ash to

produce slurry, adding collector to the slurry, feeding the slurry and collector to a submerged agitator, adding frother to the slurry and collector to which the shearing force is added, agitating the slurry to the collector to generate air bubbles, and adhering unburned carbon of the fly ash to the air bubbles to rise the unburned carbon.

The Examiner concedes that STYRON does not teach a submerged agitator for adding a shear force to the slurry and collector. Therefore, the Examiner relies on the GRAY reference for such purported disclosure.

#### A Review of STYRON

As understood, STYRON relates to a method of removing carbon from fly ash by adding a biodegradable oil conditioning agent to a slurry containing raw fly ash and water. The conditioning agent renders the carbon and the fly ash hydrophobic such that upon aeration of the slurry, air bubbles attach to the carbon particles and carry them to the surface of the slurry in a form of a froth to enable removal of the carbon.

#### A Review of GRAY

GRAY appears to teach a method of separating components of fly ash into a substantially carbon-free mineral stream and a highly concentrated carbon product. The method includes mixing fly ash with a liquid hydrocarbon to form a slurry. The slurry is then contacted with an aqueous solution, which is mixed by a mechanical mixer to disperse the hydrocarbon slurry into small droplets within the aqueous solution. The inorganic mineral matter is concentrated in the aqueous solution, and the carbon and hydrocarbon are agglomerated in the form of droplets. The droplets are collected and the hydrocarbon is separated from the concentrated carbon product.

#### Appellant's Independent Claim 1

Appellant's independent Claim 1 recites a method including, *inter alia*, the step of applying a shear force to modify the surface of unburned carbon and collector to enhance adsorption of the unburned carbon to the collector. Appellant respectfully submits that the aforementioned step of applying a shear force to the unburned carbon and collector recited in independent Claim 1 is not taught by STYRON, nor by GRAY.

***Claim 1 recites the step of applying a shear force to modify the surface of unburned carbon and collector to enhance adsorption of the unburned carbon to the collector.***

In the Office Action, the Examiner essentially argues that STYRON discloses all of the limitations of Claim 1 except for the step of applying a shearing force to the slurry and collector to modify the surface of the unburned carbon and the collector to enhance adsorption of the unburned carbon to the collector. Accordingly, the Examiner cites to GRAY and argues that GRAY teaches the step of adding a shearing force to the slurry and collector for the benefit of increasing carbon yield for the improvement of carbon fly ash beneficiation.

Appellant submits that GRAY does not disclose the step of adding a shear force to the slurry to modify the surface of the unburned carbon and collector. Rather, the agitating device of GRAY is used merely to disperse the hydrocarbon slurry within the aqueous solution; not to modify the surface of unburned carbon and collector. In this regard, a person skilled in the art would not have arrived at the step of applying a shear force to a slurry and collector after reading the disclosure of GRAY.

Indeed, the Examiner acknowledges that the combination of STYRON and GRAY does not teach applying a shearing force to the slurry and collector to modify the surface of the unburned carbon and the collector to enhance adsorption of unburned carbon to the collector. However, the Examiner argues that “*since agitation acting perpendicular to its longitudinal axis is taught, shearing force is inherent, and it meets the claim.*” (Final Office Action, page 4). Appellant submits that such a conclusion by the Examiner is simply the result of impermissible hindsight. More specifically, the agitation disclosed in GRAY is for purposes of dispersing the hydrocarbon slurry within the aqueous solution; not for modifying the surface of unburned carbon and collector. A teaching of “dispersing” slurry within a aqueous solution does not teach, suggest or make obvious the limitation of “modifying the surface” of unburned carbon and collector (i.e., unburned carbon and collector may be dispersed within a solution without having their surfaces modified). There is no teaching in STYRON or GRAY of modifying the surface of unburned carbon and collector. Rather, any mention of an agitation device in STYRON or GRAY is limited to dispersing one agent within another. Therefore, Appellant submits that a more likely combination of STYRON and GRAY would result in a method wherein the agitation device

from GRAY is added to the froth floatation method disclosed in STYRON as a means of **dispersing** the conditioning agent within the slurry containing raw fly ash and water. The Examiner's suggestion that the combination of STYRON and GRAY would produce a method including application of a shear force to **modify the surface** of unburned carbon and a collector is the result of impermissible hindsight, and not within the purview of one skilled in the art.

*Appellant's Dependent Claims 2-7*

Further, Appellant submits that Claims 2-7 are allowable at least for the reason that these claims depend from an allowable base claim and recite additional features that further define the present invention.

Accordingly, Appellant respectfully requests that the Board reverse the rejection of dependent Claims 2-7 under 35 U.S.C. § 103(a), and to remand the subject application to the Examiner with instructions to allow such claims.

**VIII. CONCLUSION**

In view of the foregoing, it is submitted that the reference of record does not render obvious the Appellant's invention as recited in Claims 1-8. The applied reference of record has been discussed and distinguished, while significant claimed features of the present invention have been pointed out.

Appellant respectfully submits that each and every pending claim of the present invention meets the requirements for patentability under 35 U.S.C. §§ 102 and 103, and requests that all of the aforementioned rejections be reversed by the Board, and that the application be remanded to the Examiner for withdrawal of all the rejections.

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Accordingly, allowance of the present application and all the claims therein is respectfully requested and believed to be appropriate.

Respectfully submitted,

Date: 6/10/10

By: \_\_\_\_\_



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## IX. CLAIMS APPENDIX

1. (Previously Presented) A method of removing unburned carbon from fly ash comprising the steps of:

adding water to fly ash to produce slurry;

adding collector to said slurry;

feeding said slurry and collector to a submerged agitator having a rotation shaft penetrating a cylindrical main body in an axial direction thereof, plurality of chambers formed by dividing an inside of the main body in the axial direction thereof and an agitating vane fixed to the rotation shaft and rotating in each chamber to apply a shearing force to said slurry and said collector to modify the surface of said unburned carbon and said collector to enhance adsorption of said unburned carbon to said collector;

adding frother to said slurry and said collector to which the shearing force is added;

agitating said slurry and said collector to generate air bubbles; and

adhering unburned carbon of said fly ash to the air bubbles to rise said unburned carbon.

2. (Previously Presented) The method of removing unburned carbon from fly ash as claimed in claim 1, wherein said shearing force is  $0.7 \text{ kWh/m}^3$  or more and  $10 \text{ kWh/m}^3$  or less per unit quantity of slurry.

3. (Previously Presented) The method of removing unburned carbon from fly ash as claimed in claim 1 or 2, wherein the concentration of said fly ash in the slurry is 3 weight percent or more and 50 weight percent or less.

4. (Previously Presented) The method of removing unburned carbon from fly ash as claimed in claim 1, 2 or 3, wherein the amount of said collector added is 5 weight percent or more, and 100 weight percent or less of amount of said unburned carbon of said fly ash.

5. (Original) The method of removing unburned carbon from fly ash as claimed in one of claims 1 to 4, further comprising the steps of separating with a solid/liquid separation device water of fly ash slurry that is separated through flotation, and water

separated is added to new fly ash or/and the water is used to erase bubbles when adhering unburned carbon to air bubbles, for purpose of reuse.

6. (Original) The method of removing unburned carbon from fly ash as claimed in one of claims 1 to 5, wherein said unburned carbon of said fly ash separated through flotation is used as fuel.

7. (Previously Presented) The method of removing unburned carbon from fly ash as claimed in one of claims 1 to 6, wherein said unburned carbon content in said fly ash separated through flotation is 1 weight percent or less and the fly ash is used as a mixing material for cement.

8. (Previously Presented) The method of removing unburned carbon from fly ash as claimed one of claims 1 to 6, wherein said unburned carbon content in fly ash separated through flotation is 1 weight percent or less and the fly ash is used as a material for manufacturing lightweight aggregate.

**X. EVIDENCE APPENDIX**

None

**XI. APPENDIX OF RELATED PROCEEDINGS**

None